

SYLLABUS
MA 3139 (4-0) Fourier Analysis and Partial Differential Equations

Text: Instructor's Notes

Hours	Topic	Pages
4 - 4	Sequences and infinite series - limits, convergence, the order notation, errors, pointwise and uniform convergence with functions	1-24
8 - 12	Fourier series and Fourier analysis - orthogonality, the Fourier coefficients, existence, even and odd functions, convergence properties and continuity, amplitudes and phases, the time and frequency domains, the complex form, applications	25-70
8 - 20	Introduction to the wave equation - separation of variables, eigenvalues and eigenfunctions, initial conditions, Sturm-Liouville fundamental modes and frequencies, traveling waves and D'Alembert's Principle, characteristics	71-136
2 - 22	The Two-dimensional wave equation - separation of variables, natural frequencies for the rectangular drum	137-150
6 - 28	The Wave equation in cylindrical regions - Bessel's functions, eigenvalues and natural frequencies of the circular drum	150-162 Annex A
6 - 34	Introduction to the Fourier transform - definition, transform pairs, transforms of simple functions, scaling, time and frequency shifts, graphical description, amplitude and phases	163-198
6 - 40	Additional topics in Fourier transforms - convolution and correlation, filters, impulse responses and transfer functions, modulation	199-233
4 - 44	Exams and holidays	

The above schedule is suggested; actual times spent on the various topics may vary somewhat. All topics will be covered, although not every referenced page will be.